CEMENT AND LIME MANUFACTURE

OL. XXVI. No. 3 MAY 1953 Price 1s. Annual subscription 6s. ($1.30 in Canada and U.S.A.)

GRINDING MEDIA INFORMATION

USED AND RECOMMENDED BY

No.1 "CRETOIDS" (Reg. No. 573298)

have been specially produced by us to meet the requirements of manufacturers for producing cement of extreme fineness. They have proved highly successful in finishing-mills without any cooling devices and, as with all our other types of grinding media, the wear-and-tear cost of "Cretoids" is infinitesimal. Free working samples are available on application.

THE WORLD'S LEADING CEMENT MAKERS

The comprehensive range of grinding media supplied by us and our unique experience in the cement industry in practically every country of the world enable us to give expert advice and to supply a type of grinding media that will provide the answer to any grinding problem.

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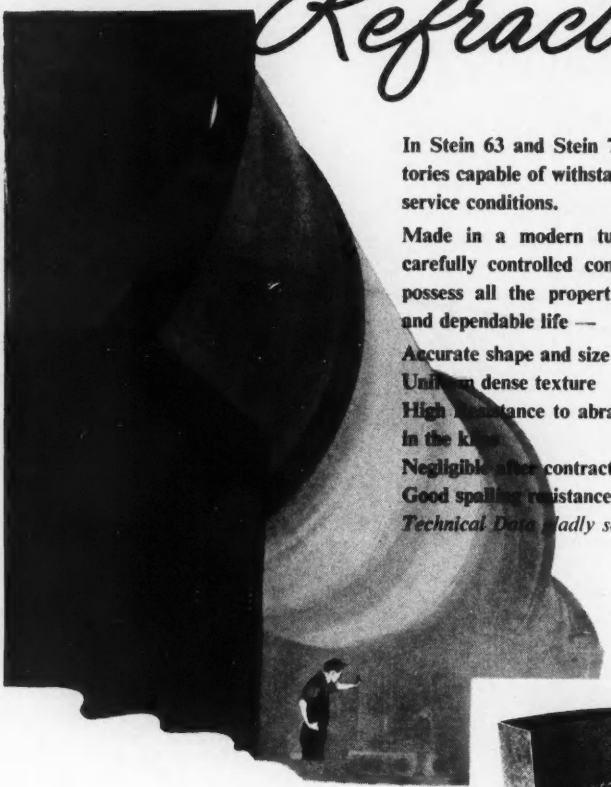
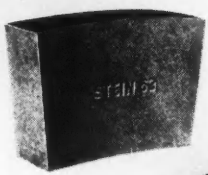
STEIN *Refractories*

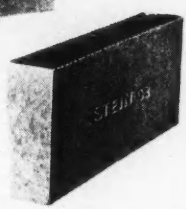


In Stein 63 and Stein 70 we offer two refractories capable of withstanding the most arduous service conditions.

Made in a modern tunnel kiln plant under carefully controlled conditions, both materials possess all the properties necessary for long and dependable life —

Accurate shape and size
Uniform dense texture
High resistance to abrasion due to hard firing in the kiln
Negligible after contraction
Good spalling resistance.
Technical Data gladly sent on request.





We are also in a position to offer a basic lining refractory in "Stein Mag. C". This is of the Magnesite/Chrome type and can be supplied in the normal block sizes.

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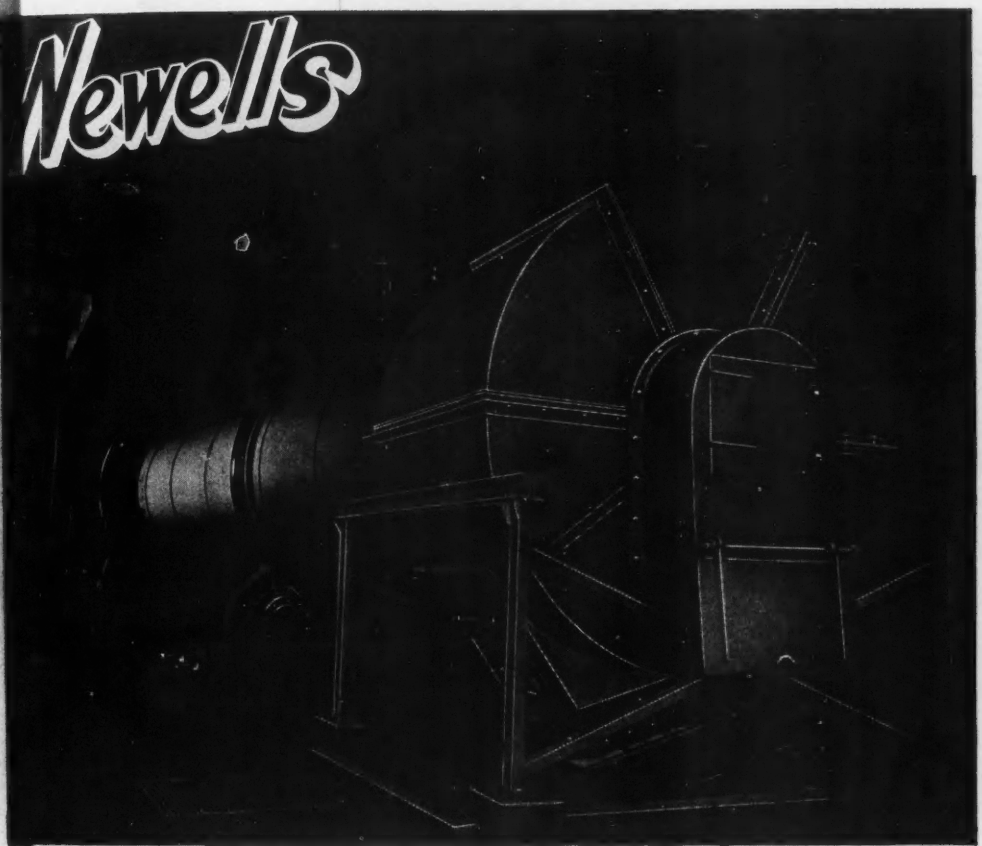


tesy Messrs. FISONS LIMITED *Copyright : 'Grimsby Evening Telegraph'*

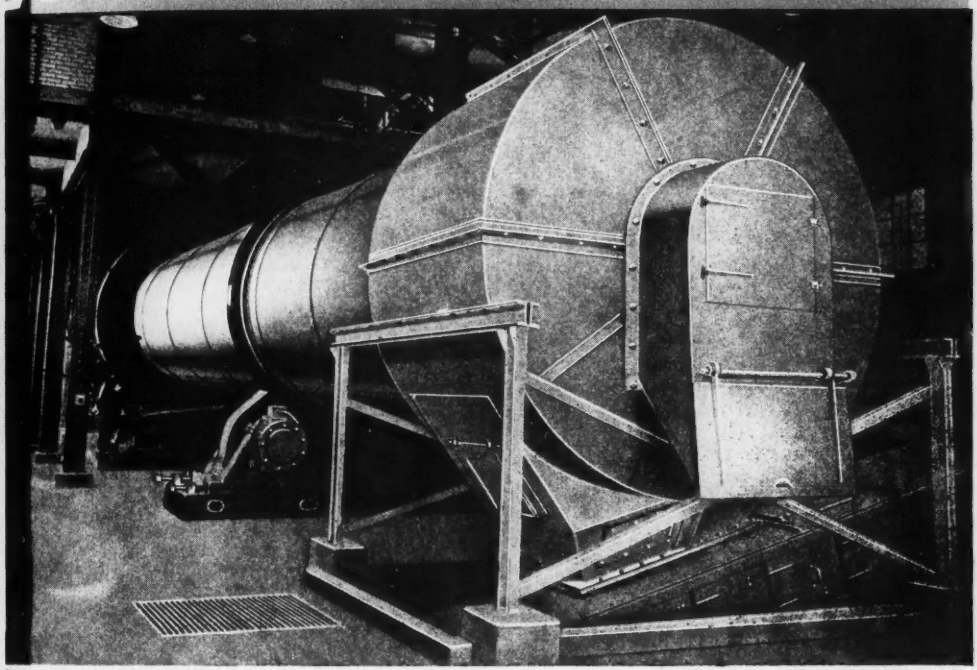
Our illustration shews Newells Super Capacity Rotary Dryer operating in the Superphosphate Plant at Messrs. Fisons, Limited, Immingham. The Dryer is 10'0" diameter, 80'0" long, revolving at 5 r.p.m. and driven by a 150 h.p. motor and handles continuously a throughput of Superphosphate of 230 TONS PER HOUR.

- The Dryer is fitted with a sequence of specially designed bucket lifters attached to the whole of the internal circumference.
- The Dryer operates at high speed and revolves very much faster than orthodox Dryers.
- The Shell and Tyres are exceptionally strong, rigid and accurately constructed so that the machine runs without any sign of vibration when operating under full load.
- **Every cubic inch of space inside the Dryer is made use of. The material being dried is cascaded uniformly over the full internal cross-sectional area and throughout the length of the Dryer.**
- The unique cascading effect obtained in this Dryer ensures every particle of material being continuously scrubbed by the drying area.
- Perfect accessibility. When the Dryer is stopped a man can walk upright through the whole length of the Dryer and examine the interior in five minutes.

- **No other Dryer yet designed can approach the Newells Super Capacity Rotary Dryer for performance, efficiency or accessibility.**

Newells

Super Capacity
ROTARY DRYERS
UP TO 250 TONS PER HOUR THROUGHPUT



Courtesy Messrs. FISONS LIMITED Copyright : 'Grimsby Evening Telegraph'

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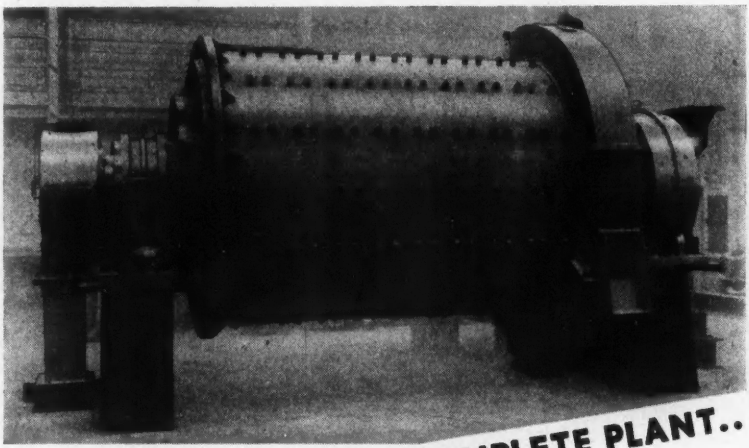
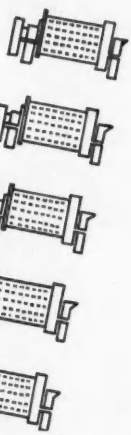


A SINGLE MACHINE OR A COMPLETE PLANT..



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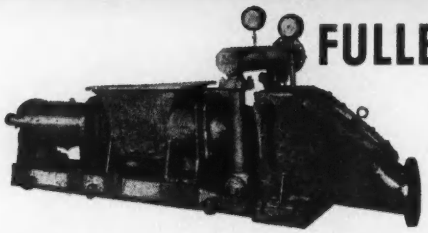
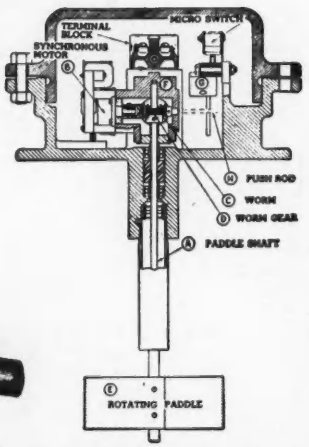


FULLER-KINYON PUMPS

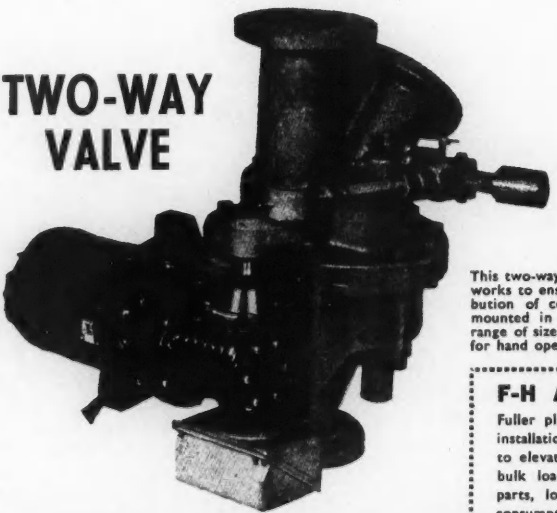
are installed at the new cement works in Ceylon, and represent the most economical and reliable means of transporting finished cement and of blending raw materials. This system is installed in practically all the most modern cement works in the world.

MATERIAL-LEVEL INDICATOR

This device is employed at this works to control valve circuits, etc., and to give audible or visible warning when material reaches or falls below a predetermined level in a bin, silo, or bunker. One or more circuits may be opened or closed by the same indicator.



TWO-WAY VALVE



This two-way valve equipment is also installed at this works to ensure a trouble-free and automatic distribution of cement and raw materials. It can be mounted in any position, and is supplied in a full range of sizes. If required, this valve can be supplied for hand operation.

F-H AIR-SLIDE CONVEYOR

Fuller plant also includes this very flexible installation for conveying cement from mill to elevator, for extraction from silos, for bulk loading and unloading. No moving parts, low maintenance costs, low power consumption, and no danger of accidents.

[redacted]

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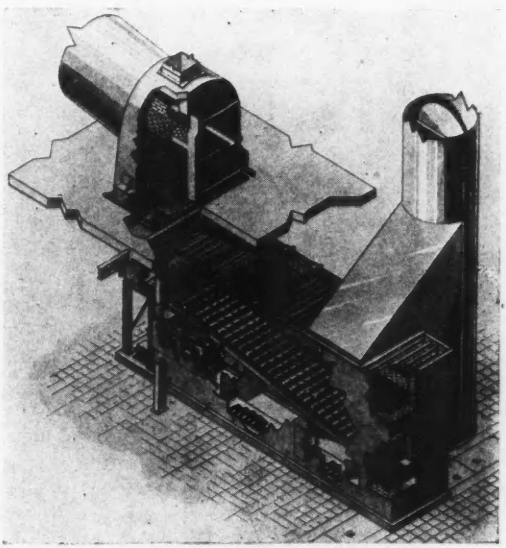
INCLUDES FULLER-KINYON PUMPS—One 6-in. diameter pump for transporting cement from the mills to the silos. One 7-in. diameter pump for transporting material from the mill to the raw-meal silos. Two 8-in. diameter pumps for blending and transporting materials from the silos to the kiln feed-hopper. One 4-in. diameter pump for passing collected dust to a raw-meal silo. FULLER-KINYON PNEUMATIC SYSTEM with FULLER REMOTE-CONTROL BOARD for blending the materials at the silos and for final transport of the raw material to the kiln feed-bin. FULLER ROTARY FEEDERS for feeding raw material to the screw-conveyor which feeds material from the silo to the pump hopper. FULLER CLINKER COOLER (illustrated and described below). MATERIAL-LEVEL INDICATOR for control of level of materials in the silos. FULLER ROTARY VALVES for controlling the flow of cement from the silos.

FULLER CLINKER COOLERS

Many millions of tons of Portland Cement Clinker a year are handled by Fuller Coolers. They ensure (1) Effective air quenching. (2) Effective heat recovery, because secondary combustion-air passes through the hottest zone of the clinker bed. (3) Fuel savings by highly preheating secondary combustion-air and by raising ignition speed of fuel. (4) High-temperature combustion-air permits low-volatile coal, and coal with high moisture content, to be used. (5) Increase in grindability of clinker.

Take advantage of Fuller's long experience in materials handling and cooling . . . A talk with one of our engineers may lead to more profitable operation.



Fuller Inclined Grate Cooler for Rotary Kilns.
(British Patents Nos. 519,018, 519,057, 580,584, 611,296).

Complete details of the full range of Fuller-Kinyon Equipment for the Cement Industry will be sent on request.

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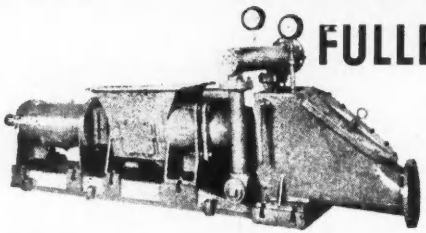
FULLER-KINYON EQUIPMENT



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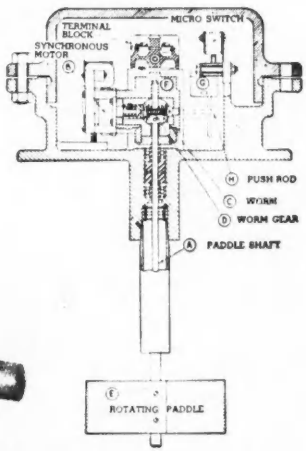

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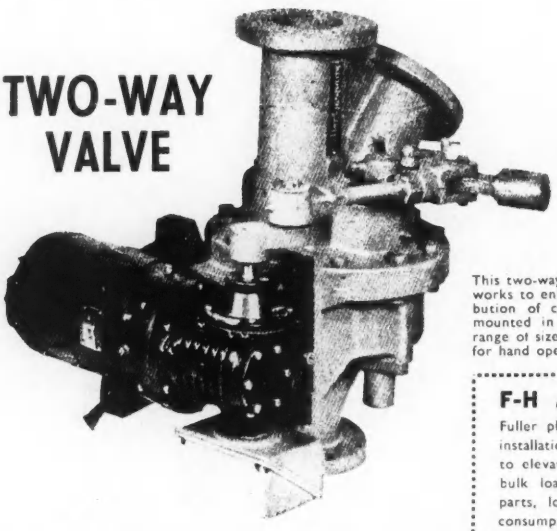

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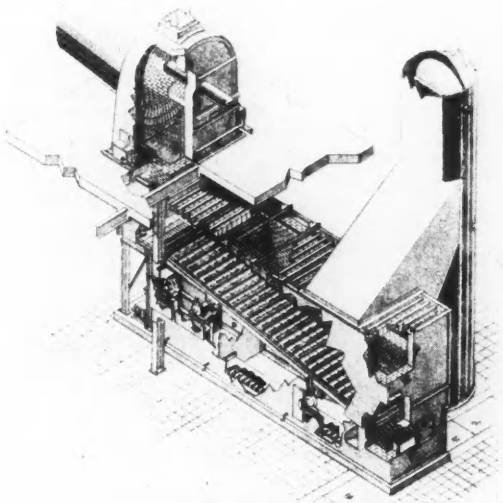

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High Efficiency
CYCLONES

Where a simple and inexpensive method of dust collection is required, "Visco" High Efficiency Cyclones will in many cases prove entirely satisfactory.

They are being successfully used for collecting a variety of dusts, such as lime, granite, metal, starch, carbon black, etc. Ministry of Supply tests show that using a dust mixture as specified in BS.1701 : 1950, the equipment is capable of giving a dust recovery efficiency of over 95%.

Battery of four "Visco" High Efficiency Cyclones recovering dust at a Northern works.

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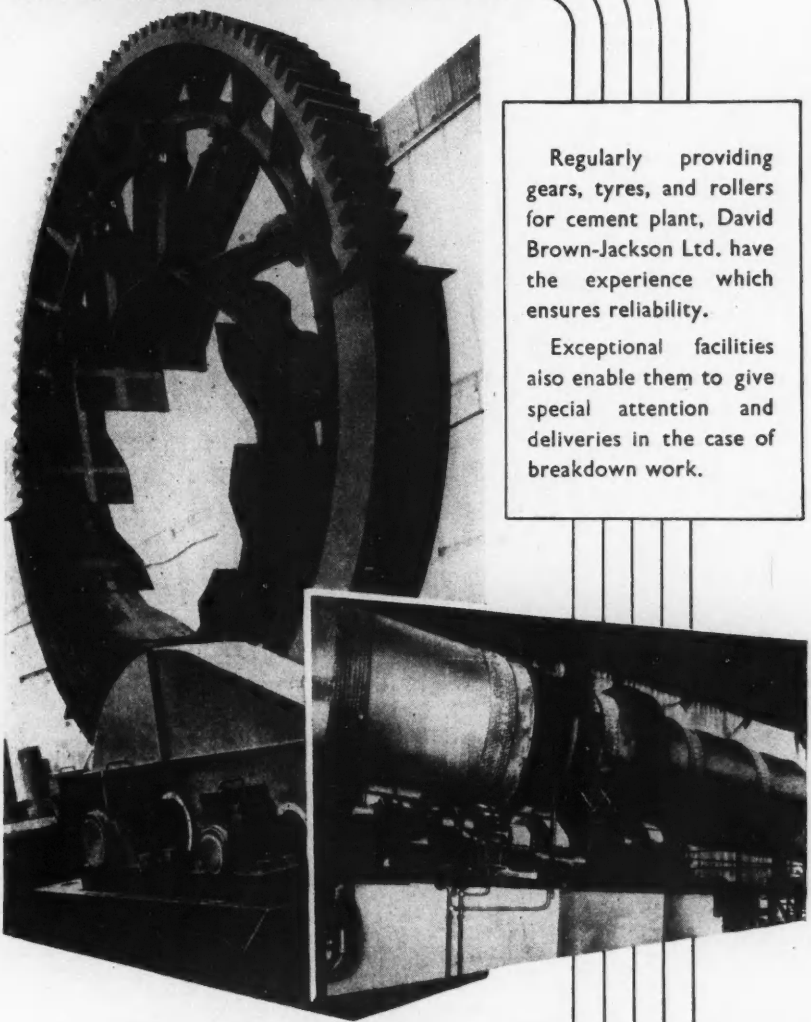
CEMENT



Regularly providing gears, tyres, and rollers for cement plant, David Brown-Jackson Ltd. have the experience which ensures reliability.

Exceptional facilities aiso enable them to give special attention and deliveries in the case of breakdown work.

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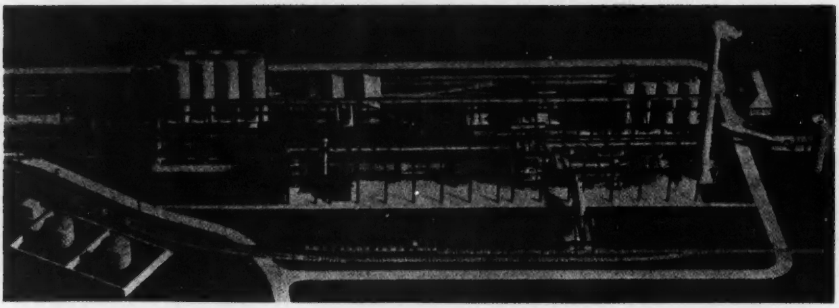

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This equipment comprises six sectional precipitators for dealing with exhaust gases from the kiln and dryers.

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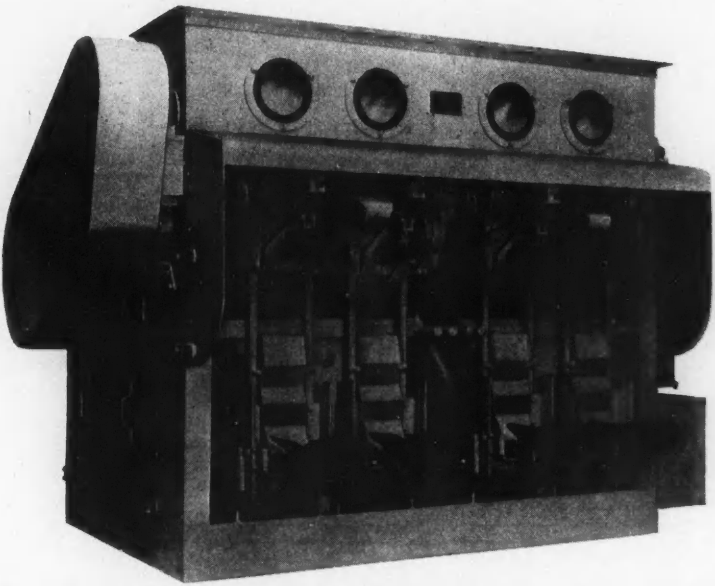

THE NEW CEMENT WORKS IN CEYLON

were equipped with 2 units, comprising "Daylor" 3 spout packers, Elevators, Screens and Hoppers, each unit having an output of 40-45 tons of bagged cement in one hour.

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We Manufacture Complete Packing, Dust-Collecting and Screening Plants for Cement, Lime, and Chemical Works.

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For all excavating problems, consult

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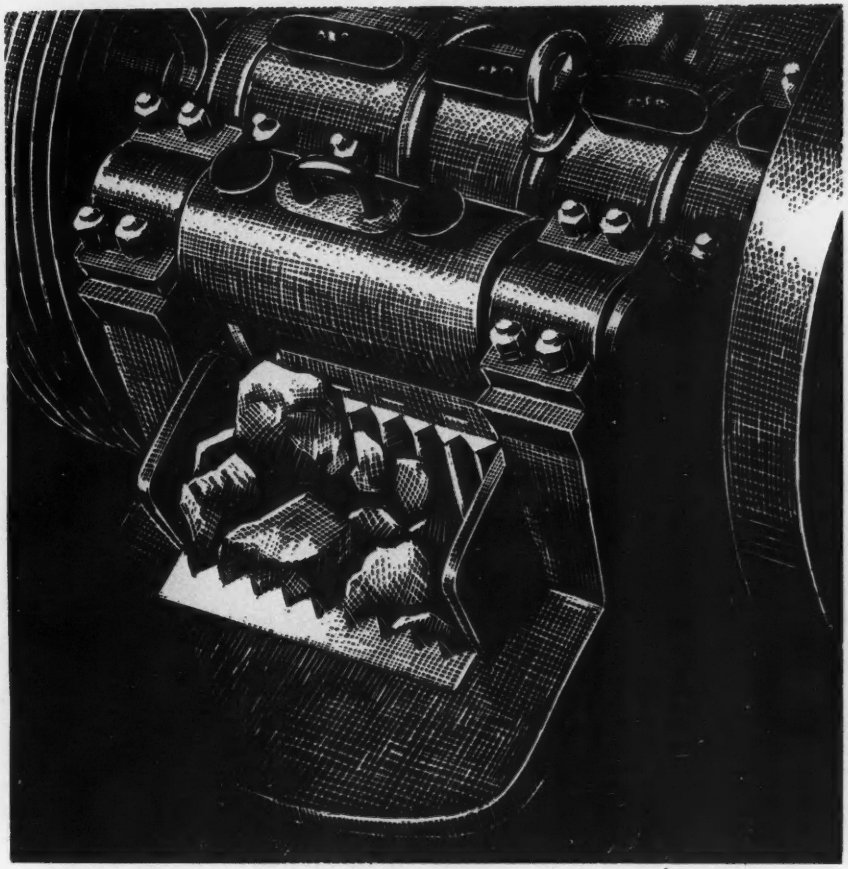

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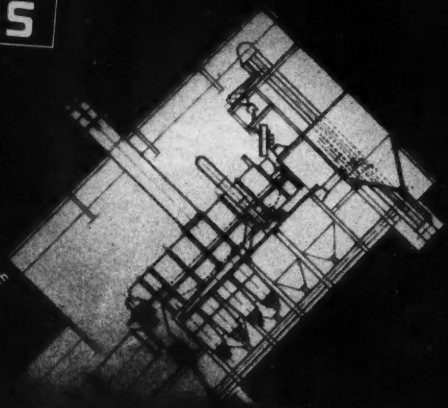

Lepol Kiln plant with Dish-Granulator 300 tons/day

"As a first step towards the complete conversion from the wet process to the dry process, Skanska Cementaktiebolaget of Hellekis, Sweden, have recently put into operation a "double-pass" Lepol Kiln supplied by the Polysius organisation. The results obtained are as follows: Guaranteed output, 500 tons per day; actual output, 552 tons per day; coal consumption, including coal required for drying coal 820,000 calories per ton. This corresponds to 11.5 per cent standard coal by weight of clinker produced. Four kilns of this new type are now in operation."

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THE BRACKENS
Ascot, Berks.
Telephones: Winkfield Row 395/396
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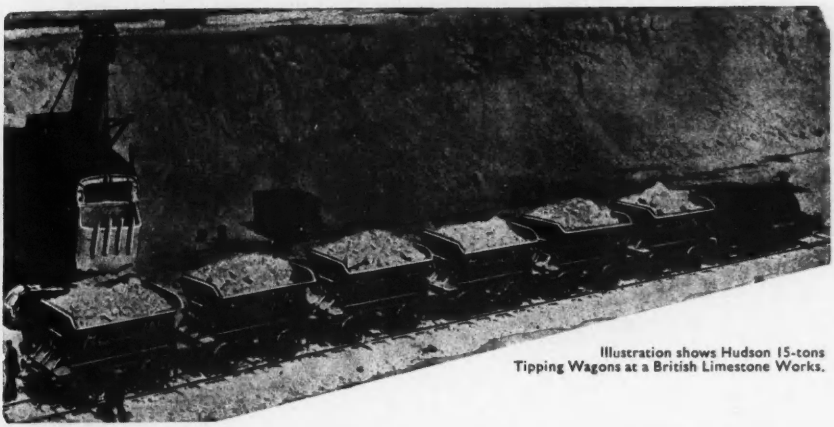

Illustration shows Hudson 15-tons Tipping Wagons at a British Limestone Works.

HUDSON TIPPING WAGONS

are in use at Kankesanturai Cement Works

The world-wide use of Hudson Tipping Wagons in the Cement and Lime industries is due to proved efficiency, with low labour and maintenance costs under working conditions of all kinds.

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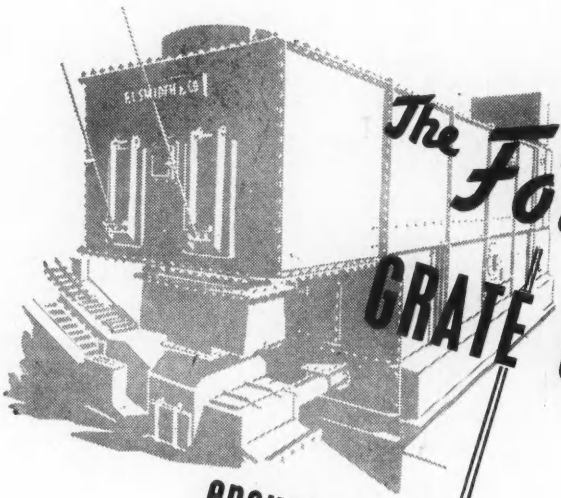

The Folax GRATE COOLER

ensures flexible kiln operation...

The amount of air penetrating the bed of the FOLAX GRATE COOLER can be adjusted independently of the amount of air required for the burning in the kiln, and the cooler and kiln speeds are independent of one another.

Other features are efficient heat recuperation, air quenching, effective cooling permitting immediate grinding, low head room, low power consumption and small maintenance cost.

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CEMENT AND LIME MANUFACTURE

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Government Cement Works, Kankesanturai, Ceylon.

By D. J. RIDGE
(OF HENRY POOLEY, CONSULTING ENGINEERS).

IN the year 1945 Messrs. Henry Pooley were invited to report on a proposal to erect a cement works in the Jaffna peninsula of Ceylon. Having satisfied themselves that there were sufficient raw materials of good quality and of water for a cement factory with a capacity of 100,000 tons per annum, the consultants concluded that a site about 1½ miles from Kankesanturai was the most suitable, having the necessary supplies of raw materials, as well as being close to the railway and as near to a potential port as was possible. The dry process, in this instance the most economical method, was chosen, chiefly on account of the cost of fuel. Provision for the duplication of the plant and capacity was included in the design; the machine shop and laboratory equipment are also adequate for a plant of twice the present capacity. The works can be extended rapidly at considerably less cost per ton of output than for the first part. In 1947 civil engineering work started, and in August, 1950, production at the rate of 2,066 tons per week commenced. A flow diagram of the works is shown in *Fig.* 1.

Raw Materials.

GEOLOGY.—Ceylon is remarkable for the huge gaps in the geological formation. Most of the well-known cement-rock producing systems are missing, including Carboniferous, Jurassic (except for two small deposits of little economic value) and Cretaceous; also missing are Trias deposits yielding gypsum adequate for the requirements. The only systems likely to produce good limestone for cement-making are the pre-Cambrian and Miocene. The pre-Cambrian limestones of the interior tend to be dolomitic, which precludes their use. The Miocene deposits are large and are found in the north and north-western districts. The southern boundary of these deposits extends from a point on the coast between

Mullaittivu and Elephant Pass to Kalpitiya, where they disappear. These cream-coloured Estuarine limestones are hard and are found directly over Gneiss and other pre-Cambrian rocks. The limestones are roughly joined, but do not appear to contain marly or shaley fissures horizontally, and vertical joints are not prevalent or regular ; there is a marked absence of the infiltration or sedimentation of clay at depths below 10 ft.

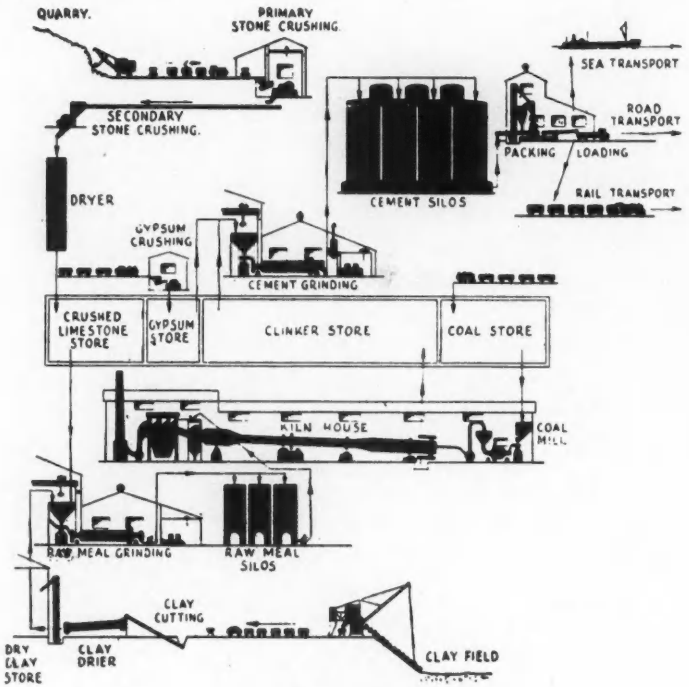


Fig. 1.—Flow Diagram.

The area adjacent to the selected site has been drifted by a red sandy clay, which covers the limestone in the low-lying basins to a depth of 7 ft. to 8 ft. The stone in places outcrops extensively, and at the site it is actually on the surface. The red clays mentioned are too high in iron content for satisfactory cement manufacture, but the top soil at the site is thin enough to preclude their having any deleterious effect. The limestone selected has a depth of 30 ft. to 40 ft. The limestone adjacent to the site is quarried by compressed-air drilling and blasting and conveyed a distance of less than ¼ mile to the limestone crushing plant by 3½-cu. yd. Muir-Hill petrol-driven dumpers loaded by a Marion 1½-cu. yd. diesel excavator.

LIMESTONE CRUSHING.—Limestone is tipped from the dumpers into an 8-tons steel hopper, from which it passes by a variable-speed inclined apron-feeder

(3 ft. 6 in. wide) to a 3 ft. 6 in. by 2 ft. 6 in. swing-jaw crusher (*Fig.* 2). The conveyor is supported at 3 ft. centres and is driven by a 10-h.p. motor. The crusher, which is driven by a 120-h.p. motor, is capable of reducing stone of about 1 ft. 6 in. to 4 in. cubes at the rate of 60 tons per hour. The product from the crusher is discharged on to an inclined troughed-band conveyor 2 ft. 6 in. wide by 145 ft. long, which carries the stone to a Fraser & Chalmers FXT/8/42 hammer-mill driven by a 110-h.p. motor, which reduces the stone to minus $\frac{3}{4}$ in. Stone from the hammer-mill is discharged directly into a grabbing-pit in the main store.

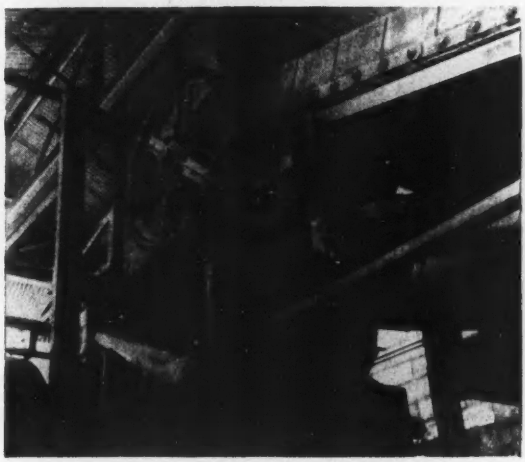


Fig. 2.—Limestone Apron-feeder and Jaw Crusher.

CLAY CUTTING.—The main sources of clay, on the north of the island, are obtained from large lagoons which at some period were creeks or rivers; these were in the past dammed by man and the clay has gradually, over a long period of time, been deposited to a depth of 3 ft. to 5 ft. on the beds of these lagoons. The deposits used are those at Marunkan, near the Mannor peninsula. An area of about 200 acres was cleared of trees and scrub; this area is subject to flooding by a nearby river from October until March during the south-west monsoon, and in order to prevent flooding an earth bund was constructed around the whole of the area. The clay is excavated by a 1-cu. yd. Steenbrugge dragline shovel, loaded into double-bogey low-sided 20-tons wagons, and hauled by the Ceylon Government Railways' locomotives to the cement works some 150 miles distant. At the works the clay is discharged from the rail wagons into a hopper feeding an Edgar Allen "C" type clay cutter (*Fig.* 3) of 7 ft. 10 in. diameter with a revolving table driven through bevel-gears by a 30-h.p. motor. Storage for clay is in the form of a roofed canopy adjoining the cutting plant. Sufficient clay can be stored to provide for the wet season which renders excavation at Marunkan impossible. Clay, when not fed by rail trucks, is loaded by hand

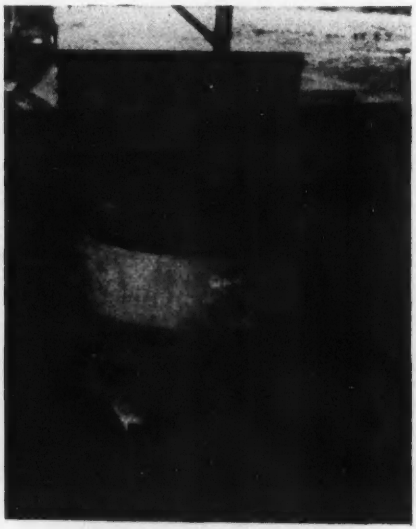


Fig. 3.—Clay-cutting Plant.

into the feed hopper of the cutter. Wet clay chips from the cutter are conveyed at an incline by a flat band conveyor 2 ft. 6 in. wide by 140 ft. long to the clay-drying plant.

CLAY DRYING.—Wet clay is fed at the rate of 5 tons per hour into a rotary dryer 6 ft. 6 in. diameter by 50 ft. long driven by a 30-h.p. motor through totally-enclosed reduction-gears. The dryer is heated by exhaust gases from the kiln or by a separate oil-fired furnace, and is designed to reduce the moisture content of the clay from about 15 per cent. to 2 per cent. The clay from the rotary dryer passes through a 1-ft. 10-in. rotary discharge valve which forms an air seal,

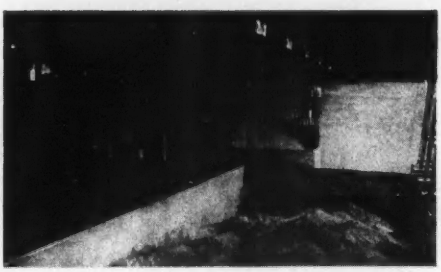


Fig. 4.—Main Store Building with Crushed Limestone in Foreground.

and which is driven through totally-enclosed worm-reduction gears by a 2½-h.p. motor. Clay from the dryer is delivered by an apron-conveyor 32 ft. long to an elevator 1 ft. 6 in. wide by 40 ft. centres, and is discharged from the elevator through a chute into the main stores.

MAIN STORE BUILDING.—The main store building (*Fig.* 4) is constructed with reinforced concrete bases and retaining walls of an average height of 12 ft. Buttresses carrying the main steel stanchions are spaced at 17 ft. 6 in. centres and support the crane rails and roof. The store is 718 ft. long and 70 ft. wide.

Fig. 5—Feed End of Raw Mill.

A 5½-tons electric grabbing-crane (by Sir William Arrol & Co., Ltd.), traverses the length of the store for the transport of limestone, clay, clinker, gypsum, and raw coal if necessary. Separate compartments are provided for about 5,600 tons of wet limestone, 1,800 tons of dry limestone, 3,500 tons of dry clay, 2,400 tons of uncrushed gypsum, 850 tons of crushed gypsum, 2,000 tons of coal, and 13,000 tons of clinker.

LIMESTONE DRYING.—Wet limestone in the main stores is fed on to a 5 ft. 6 in. diameter table feeder and thence by chute to an elevator 38 ft. high by 1 ft. 6 in. wide which feeds a single-tube rotary dryer, 6 ft. 6 in. diameter by 50 ft. long, capable of dealing with 17 tons of wet stone per hour and reducing the moisture content from 8 per cent. to 2 per cent. The construction and drive of this dryer are similar to those of the clay dryer. Limestone from the dryer is taken by an apron-conveyor 12 ft. long to a totally-enclosed elevator 1 ft. 6 in. wide by 40 ft. long. Stone from the elevator is discharged through a chute into the main stores.

RAW MATERIAL GRINDING.—The crane in the stores picks up in turn crushed and dried limestone and clay and transports them to a steel bunker with three compartments. A 5 ft. 6 in. table-feeder transfers limestone to the raw mill (*Fig.* 5) and two 4 ft. table-feeders transfer clay to the raw mill. This mill (supplied by Messrs. Vickers-Armstrongs, Ltd.) is 7 ft. 6 in. diameter by 40 ft. long and is divided into four compartments, the first being lined with chrome-steel stepped plates, the second with chrome-steel non-slip plates, and the two finishing chambers with hard cast-iron corrugated bricks. The grinding media, totalling about 50 tons, range from 4 in. high-carbon forged-steel balls to $\frac{5}{8}$ in. high-carbon heat-treated steel Slugoids. The output of the mill is 24 tons per hour ground to a fineness of 8 per cent. residue on a 170-mesh sieve, and is transported from the mill to the raw-meal silos by a 7 in. diameter Fuller-Kinyon pump.

The four reinforced concrete raw-meal silos are 66 ft. high by 23 ft. diameter and are each divided into half silos. Each half silo has a capacity of 323 tons and is fitted with an access ladder with rungs 1 ft. apart, commencing from the conical section. These rungs act as markers; additional markers spaced 4 ft. apart are fitted to the ladder in No. 5 half-silo. For blending the materials between the silos, and for final transport of the blended raw meal to the kiln, the Fuller-Kinyon electro-pneumatic system is installed, the main remote-control board for the system being in the laboratory. The design is such that dust-laden air on top of the silo can be effectively cleansed by a Visco Beth dust collector, which passes back into the silos all the dust collected. Raw material is fed through Fuller rotary feeders to two totally-enclosed screw conveyors 2 ft. diameter by 124 ft. long, which are able to transfer 30 tons per hour of raw meal from the silos to the hopper, of 10 tons capacity, of the Fuller-Kinyon pump, with raw meal weighing 64 lb. per cubic foot. Two 8 in. diameter Fuller-Kinyon pumps each with a capacity of 60 tons per hour (one being a standby) blend the material and transport it from the silos to the feed-hopper of the kiln; this hopper is of 100 tons capacity, and passes the raw meal, by means of 11 in. diameter variable-pitch twin extraction screws, to the scoop-feed of the kiln.

The Kiln.

The kiln (*Fig.* 6) by Messrs. Vickers-Armstrongs, Ltd., is of all-riveted construction. It has diameters of 14 ft. 3 in., 11 ft. 6 in., 9 ft. 6 in., and 10 ft. 6 in. and is 255 ft. long. It weighs more than 400 tons, and rests on cast-steel tyres supported on cast-steel rollers which in turn are mounted on spindles of carbon steel in oil-lubricated water-cooled swivel bearings. All bearings are carried on box-section cast-iron bedplates, which are reinforced with steel tension poles and mounted on concrete piers. The driving gears (*Fig.* 7) comprise a spur ring in two sections around the shell, having 128 teeth of $4\frac{3}{4}$ in. pitch and $8\frac{1}{2}$ in. long meshing with a pinion with 17 teeth 16 in. long keyed to a forged-steel shaft. Also keyed to the shaft is a spur wheel with 47 teeth $11\frac{1}{2}$ in. long at $3\frac{1}{4}$ in. pitch meshing with a steel pinion, with 19 teeth $11\frac{1}{2}$ in. long, mounted on a forged-steel shaft. The whole of the driving gear is mounted on a bedplate and the gears are direct-coupled to a totally-enclosed double-reduction gear-box driven by a 104-h.p. variable-speed motor.

A feature of the kiln is the pre-heater, which is in the 14 ft. 6 in. diameter portion of the kiln at the feed end. This device is arranged so that material can be fed into the kiln in a dry condition and be effectively pre-heated before entering the main body of the kiln. Steel cylinders of 2 ft. 6 in. internal diameter are arranged around the internal periphery of the shell, the material being conveyed along the tubes, by means of steel spirals, into cast-iron discharge chutes from which it is delivered into the annular space lined with heat-resisting cast-iron plates. Gases drawn in the opposite direction to the travel of the material pass along, and radially between, the tubes on their way to the kiln exit, thus pre-heating the material in the tubes. The kiln is fitted with a firing hood for firing by both coal and oil. The induced-draught fan, which works in conjunction with the kiln, is capable of dealing with up to 48,000 cu. ft. of exhaust gases per minute at a temperature of about 392 deg. F. Directly coupled to a 130-h.p. motor, through a Vulcan-Sinclair hydraulic coupling, all the main bearings of the fan are water cooled. A sectional elevation of the kiln and ancillary plant is given in *Fig.* 9.

Fig. 6.—The Kiln.

DUST RECOVERY.—A Fraser & Chalmers Micron dust-precipitator plant is installed for dealing with exhaust gases from the kiln and dryers, and comprises six sectional precipitators. The dust collected is passed back to No. 1 raw-meal silo by a 4 in. Fuller-Kinyon pump. Exhaust gases are passed by the induced-draught fan through the dust collectors to a reinforced concrete chimney 200 ft. high and thence to atmosphere.

OIL FIRING.—A Wallsend-Howden oil-firing installation comprises a daily service tank of 25 tons capacity, two vertical oil-fired boilers, and two steam-operated heating and pumping units each capable of raising the temperature of 4,000 lb. of fuel oil from 60 deg. F. to 240 deg. F. in one hour. Complete oil-atomising units provide for boilers, kilns, and dryers ; a small electric heater for pre-heating oil for firing the steam boilers is included for use when necessary. A complete air-swept coal plant is also installed for use if coal is used ; this plant acts as a standby firing system.

CLINKER COOLING.—Clinker from the kiln falls into a Fuller inclined eccentric-grate cooler ; this cooler is constructed where necessary of heat-resisting steel and has a fan of 55 in. diameter driven by a 50-h.p. motor. The clinker passes from the cooler (cool enough to be touched by hand) on to a drag-link conveyor and thence by elevator to the main store.

GYPSUM CRUSHING.—Imported gypsum, delivered by rail, is deposited in the store and transferred by overhead crane to the gypsum crushing plant in the store. The crushing plant, which operates for an average of 16 hours per week, consists of a 1 ft. 6 in. by 10 ft. apron feeder and a 1 ft. 8 in. by 10 in. roll jaw crusher driven by a 10-h.p. motor.

Clinker Grinding.

Clinker deposited in the main store bunker by the overhead crane is fed by means of a 5 ft. 6 in. table feeder to the cement mill. Similarly gypsum is fed through a 4 ft. table feeder to the mill. This four-compartment mill is 7 ft. 6 in. diameter by 40 ft. long and weighs about 119 tons. It has an output of about 19 tons per hour of cement ground to a fineness of 5 per cent. residue, or 12 tons per hour to a 1 per cent. residue, on a 170 mesh. An 8-h.p. motor drives the mill through totally enclosed single reduction gears. The motors for the cement and raw mills are in a separate compartment which has a Visco air-filtration plant (to keep the atmosphere as dust-free as possible) capable of supplying 15,000 cu. ft. of air per minute. A cross section through the works is given in *Fig.* 8.

Cement Transport and Storage.

Cement is transported from the mills by 6 in. diameter Fuller-Kinyon pumps (*Fig.* 10) to four reinforced concrete silos at the rate of 19 tons per hour. Indicators, both visible and audible, in the mill motor house show when a silo is full. The silos are 87 ft. 6 in. high by 30 ft. diameter and have a capacity of 2,260 tons each. Cement is drawn from the silos by two extraction worm conveyors 1 ft. 6 in.

diameter by 153 ft. long, the flow being controlled by Fuller rotary valves. These conveyors discharge 35 tons of cement per hour to cross conveyors and thence to totally enclosed dumper-type vertical elevators 1 ft. 6 in. wide by 58 ft. high. From the elevator head the cement is discharged to vibrating screens to remove any foreign matter before passing to the hopper which feeds the packer.

Packing.

Two Darnley Taylor three-spout " Modern " packers, each having an output of 40 tons per hour of bagged cement, are installed. Overflow of cement from the packer-hoppers is collected into a bin having a capacity of 55 tons and can be passed back to the cross-conveyor feeding the packer-hopper, thus acting as a standby supply for the packing machines. Filled bags fall on to a 2 ft. by 70 ft. reversible flat-band conveyor which extends on to the platform for loading rail wagons or lorries. A Visco Beth suction-type automatic dust collector is also installed in the packing plant. A sack elevator handles and discharges empty sacks from any floor of the packing plant.

Fig. 7.—Kiln-driving Gear.

Miscellaneous.

Transport of cement, oil, clay, and gypsum is by two Ruston & Hornsby 88DS diesel shunting locomotives, and an Avery road/rail weighbridge has been installed for weighing incoming stocks of gypsum etc., and outgoing cement. The principal machines in the workshop comprise a lathe and milling, screwing,

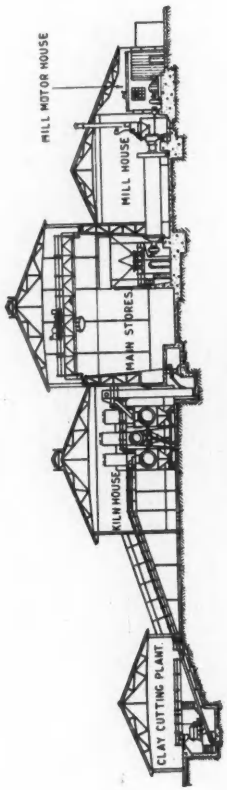


Fig. 8.—Cross Section.

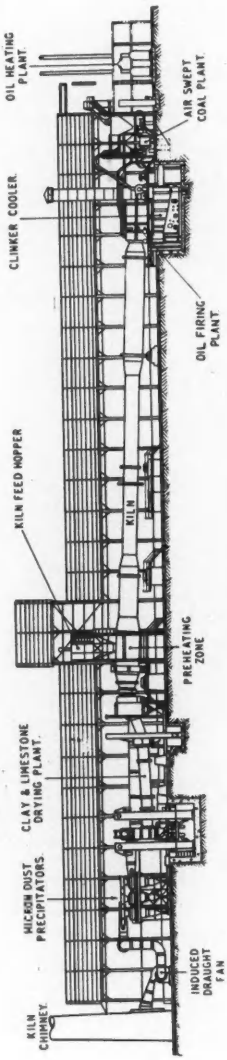
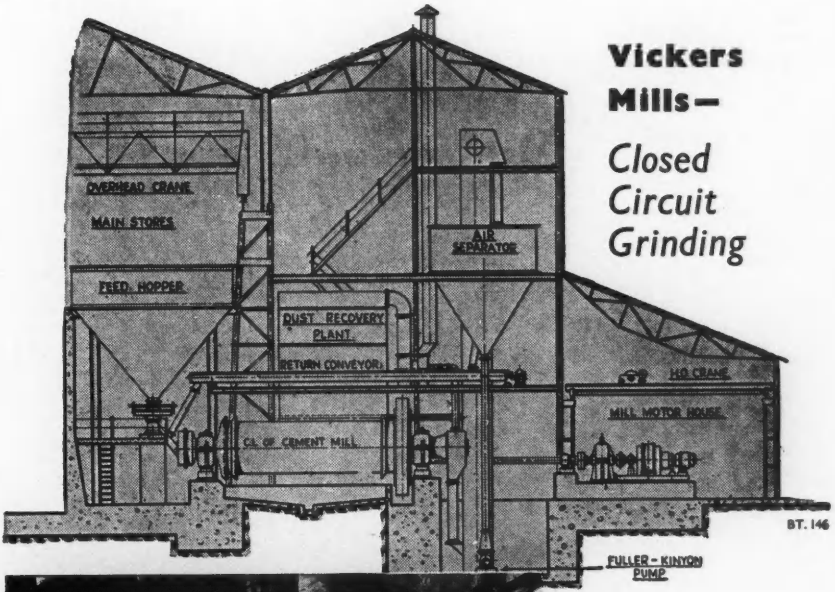


Fig. 9.—Longitudinal Section.



Vickers Mills—

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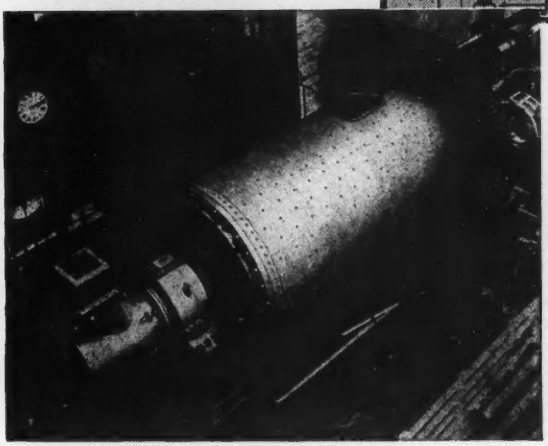

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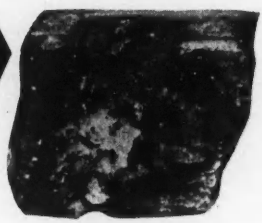
1



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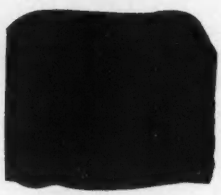

In photograph No. 1 the acid brick clearly shows the di-calcium silicate dusting while the basic brick in photograph No. 2 shows the Portland Cement pellet and brick remaining perfectly stable.

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The power station and electrical installation for this factory were the subject of an article in the September, 1952, number of this journal.

SUBMARINE OIL PIPELINE.—A feature which, when installed, will reduce costs is the off-loading of oil from the sea to storage tanks. This improvement on the present method of delivery by rail tankers has already been advised by the consultant's specialists, who have established that the installation of a submarine pipeline would be economical. The scheme in general includes a submarine pipeline for transporting furnace and diesel oil from ocean-going vessels to the cement works and power station respectively. Additional oil-storage tanks will be installed adjacent to those existing. Anchoring facilities will be available for ocean-going tankers up to 16,000 tons. A 10 in. submarine pipeline will be connected between the mooring and the heavy-fuel tank with an 8 in. off-take

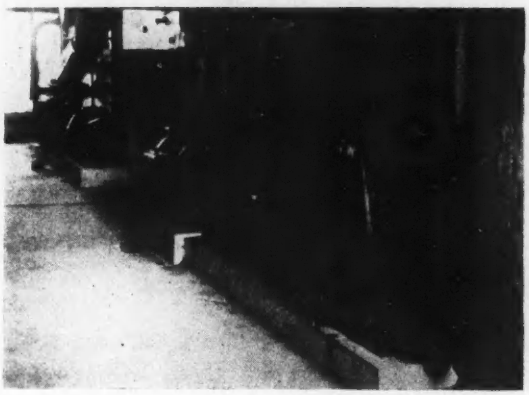

Fig. 10.—Cement Pump.

pipeline for the diesel oil. The oil separation tank ("slop" tank) included will obviate the need for an additional submarine pipeline, for example, a 10 in. pipe is cleared of furnace oil by the diesel oil that follows when the ship is discharging, and a cut is made into the separation tank for this purpose. The mixed furnace and diesel oil taken from the "slop" tank can be used for kiln firing. This installation will add another advantage to a factory already equipped with modern machinery.

The principal contractors concerned in the supply of the plant, machinery, and buildings, were as follows: Messrs. Vickers-Armstrong, Ltd.—cement-making machinery; Messrs. A. & J. Main & Co., Ltd.—steel-framed buildings; Metropolitan-Vickers Electrical Co., Ltd.—main sub-station transformers, motors, and starters; Messrs. Crompton-Parkinson, Ltd.—switchgear, cables,

distribution, and transformers for outside distribution, etc.; Messrs. Mirrlees, Bickerton & Day, Ltd., and Messrs. Crompton-Parkinson, Ltd.—power station machinery; Messrs. William Neill & Son, Ltd.—oil tank installations; Messrs. Ruston & Hornsby, Ltd.—locomotives; Messrs. E. Boydell & Co., Ltd.—quarry dumpers; Messrs. F. A. Greene & Co., Ltd.—workshop equipment; Messrs. W. & T. Avery, Ltd.—weighing machines and railway weighbridge; Visco Engineering Co., Ltd.—air-filtration plants; Consolidated Pneumatic Tool Co., Ltd.—quarry air compressors and drilling equipment; Messrs. Robert Hudson, Ltd.—tipping wagons; Messrs. Herbert Morris, Ltd.—power station crane; Sir William Arrol & Co., Ltd.—overhead grabbing crane. All the works described were carried out to the design and under the supervision of Messrs. Henry Pooley, of Westminster, S.W.1, consulting engineers to the Government of Ceylon for the construction of the cement factory.

Cement Industry in Turkey.

A company with a capital of £9,000,000 (Turkish) has been formed to modernise and extend the cement factory at Ankara. It is intended to increase the present production of 15,000 tons a year to between 60,000 and 90,000 tons a year.

The production of Portland cement in Turkey is now at the rate of 420,000 tons a year, which will be increased to 550,000 tons when the works under construction at Meknes is in production. The total consumption of cement in Turkey is now 800,000 tons a year.

Patent Relating to Cement.

In the manufacture of cement, previously-dried and finely-powdered acidic cement-forming materials of siliceous, argillaceous, or ferruginous nature are introduced directly into the combustion zone of the rotary kiln. The acidic materials comprise coal shale, boiler ash, pyrites waste, waste from the manufacture of alum, sulphurous residues, or residues containing zinc; the heat of the combustion zone being sufficient to eliminate such deleterious components as sulphur, zinc, or alkalis. The materials may be mixed with substances rich in lime, for example the dust from cement kilns, and may be introduced with or separately from the fuel. No. 639,240. H. W. Mooser. December 17, 1947.

[Publication of British patents has been delayed due to the war.]

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AT Settlingstones in Northumberland, close by Hadrian's Wall, is a mine unique in the whole world. It is the only mine where witherite ore is the main product. The owners are Settlingstones Mines Ltd., founded in 1907 to develop a mine started in 1690.

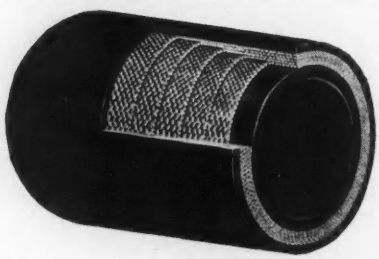
A Remarkably Versatile Ore

Witherite, a natural barium carbonate, has many uses in industry and medicine. For instance, barium sulphate, a derivative of witherite, is used in the manufacture of paints, inks, linoleum, rubber and paper. Other derivatives go into textiles, explosives, ceramics and soap. The items listed are just a few of the uses of this remarkable ore. The main stopes at Settlingstones are between 600′ and 700′ below ground. The ore is first drilled and then blown down. Compressed air is fed to the percussive drills by Goodyear hose, which is carried over the top of the loose rock. This hose operates under extremely punishing conditions, but it has given long, dependable service, and is proved to be fully capable of withstanding cutting and bruising. Other Goodyear hose is used for ventilation and de-watering as the mine is developed.

Reliability of Goodyear Hose

Why are Goodyear Industrial Rubber Products chosen for such a unique mine as this. Because their reliability is the result of over 50 years' experience in rubber engineering. Because skilled Goodyear technicians supervise their manufacture from the very beginning. Because rigid adherence to specifications of materials and processes gives complete confidence. Because only the very finest raw materials are used. That is why Goodyear products are giving years of trouble-free service, the world over.

Drilling a Charge Hole in Settlingstones Mine. Working under extremely punishing conditions, the Goodyear Hose which feeds compressed air to the percussion drills is giving long, dependable service at Settlingstones.



HEAVY DUTY WRAPPED PLY HOSE

Specially built to withstand the toughest operating conditions, this hose is ideal for use with air-drills, chipping, caulking and riveting hammers. It has a seamless, non-porous tube reinforced with wrapped plies of heavy-duty fabric. Manufactured in 60′ lengths. There is an alternative type available which has braided cord reinforcement.

Illustrated and informative catalogues are now available for all Goodyear Industrial Rubber Products. Please write to Dept. I S Goodyear Tyre & Rubber Co. (G.B.) Ltd., Wolverhampton, stating the products in which you are interested.

GOODYEAR

INDUSTRIAL RUBBER PRODUCTS

TRANSMISSION BELTING • V-BELTS • CONVEYOR BELTING • INDUSTRIAL HOSE

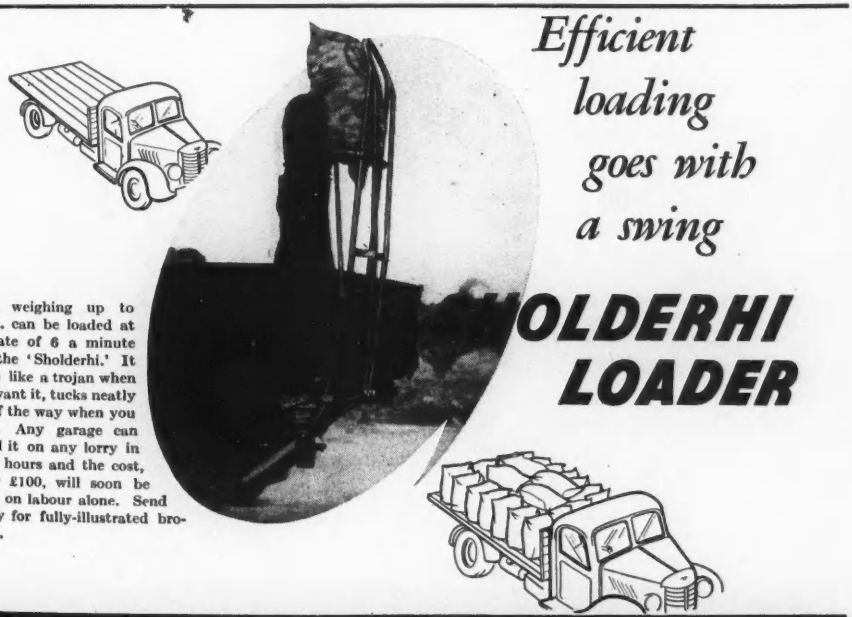
Shape of the Flame in the Rotary Kiln.

A PATENT recently granted in the U.S.A. to Mr. Theodore Nagel deals with a burner for rotary cement kilns which injects a stream of fuel into the kiln so as to produce a wide flat flame parallel to the surface of the charge in the clinkering zone. It is claimed that this flame transfers about half of its liberated radiant heat directly to the charge, and moves the clinkering-temperature zone forward to the kiln exit, thereby inhibiting annealing of the clinker within the kiln. Because more high-temperature heat is radiated to the charge in the clinkering zone per unit of fuel burned, more clinker is said to be produced per unit of fuel.

The new type of burner can be easily fitted to existing kilns. It is stated that in the case of three coal-burning kilns (9 ft. by 125 ft.), with clinker coolers, in which the new burner has been operated for two years, the following average economies have been achieved: 15 per cent. increase in clinker production per kiln hour; 10 per cent. decrease in coal consumption; substantially longer operating periods before renewal of refractory linings in the clinkering zone is required. The foregoing is abstracted from " Pit & Quarry " for December, 1952.

Consumption of Cement in Hongkong.

IT is reported that the production of cement in Hongkong in the year 1952 was 69,000 tons, and that about 120,000 tons were imported. Of the imports during the first eleven months of last year 98 per cent. was supplied by Japan and 0.4 per cent. by the United Kingdom.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Sacks weighing up to 3 cwt. can be loaded at the rate of 6 a minute with the 'Sholderhi.' It works like a trojan when you want it, tucks neatly out of the way when you don't. Any garage can install it on any lorry in a few hours and the cost, under £100, will soon be saved on labour alone. Send to-day for fully-illustrated brochure.
A. J. MACKANESS LIMITED. BILLING, NORTHAMPTON PHONE COGENHOE 292 5 LINES

New Cement Works.

Angola.

THE new Lobite cement works at Angola, Portuguese West Africa, started production in January ; it has an annual capacity of 90,000 tons.

Haiti.

WORK has started on the erection of a new cement factory at Source Matelas, Haiti, and it is expected to be in operation at the end of this year.

Peru.

IT is announced that a new cement factory is to be built at Sicuani in Southern Peru. At the present rate of construction of cement factories it is expected that Peru will soon produce enough cement to supply the country's requirements. It is said that sources of raw materials are inexhaustible.

El Salvador.

A NEW cement works at Acajutla, El Salvador, has now started production. The retail price has been fixed at 4.25 dollars, compared with the current price of 5.50 dollars, in order to meet German competition at a price which is anticipated to be as low as 3.75 dollars.

Production of Cement in Mexico.

MORE than 2,000,000 tons of Portland cement were produced in Mexico in the year 1952. It is reported that this is sufficient for Mexican requirements, and it is anticipated that there will be a surplus for export in the year 1953.

FANS for

KILN DRAUGHT
SECONDARY AIR
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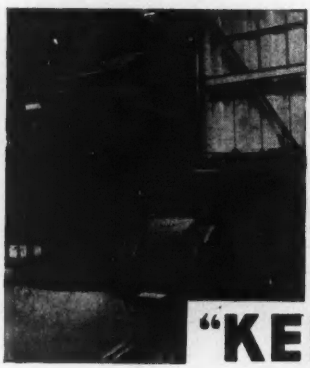
DUST REMOVAL
KILN COAL FIRING
SACK CLEANING
CONVEYING
BOILER DRAUGHT
VENTILATING, etc.



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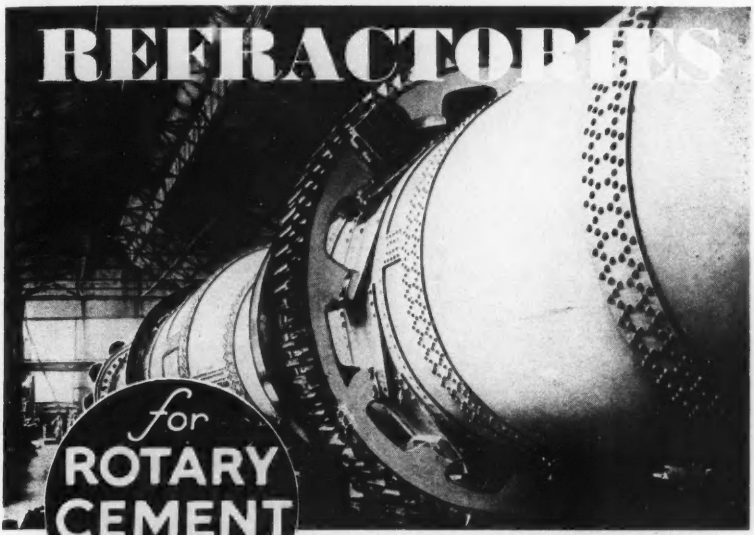

DAVISON Refractories are specially compounded to suit the conditions prevalent in the different zones of rotary cement kilns. They enjoy the confidence of cement works executives both in this country and abroad. The services of G.R. engineers and technicians are available to advise on all problems connected with the use of refractory materials.

For the Calcining Zone—ALUMANTINE.
In this zone the lining must be resistant to high temperatures over long periods and to severe chemical action. "Alumantine" brand refractories (60-65% Alumina) have proved highly successful for lining this section.

For the Intermediate Zone—HYSILYN.
The refractories used in this zone should be tough, dense and able to withstand continuously temperatures averaging 1000-1200° C. "Hysilyn" brand refractories are recommended for this section, and may be depended upon to give excellent results.

For the Feeding End—ADAMANTINE.
"Adamantine" brand is recommended for this section. This material is hard, tough and unaffected by lime, alkalies or moisture, and resistant to any changes of temperature likely to be encountered. These bricks are renowned for the length of service given.

Full technical details are given in our catalogue, a copy of which will be sent on request.

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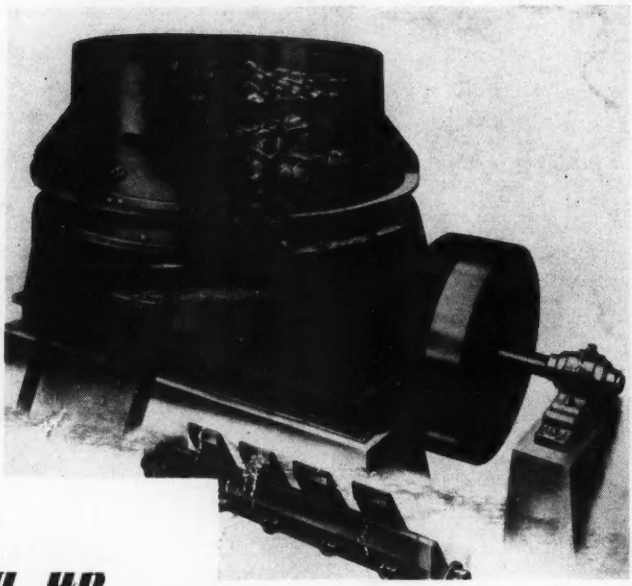

For the breaking up of Clayey Materials

The breaking up and feeding of wet plastic substances such as clays have always been difficult problems with which engineers have been faced in chemical works, brickworks, clay-drying installations, collieries, and ceramic industries. Machines such as crushing rolls and edge-runner mills have been employed in an effort, hitherto unsuccessful, to solve these problems.

Crushing rolls and other machines of this type break the material into large irregular flat pieces, and give an irregular discharge with frequent stoppages when sticky material has to be dealt with.

An objection to the use of such machines as edge runner mills is the compression of the clay, which in some cases impairs its condition in regard to absorption of water.

The STAG CUTTER

is an efficient disintegrator and reducing machine for fatty clays and similar materials, which can be conveyed as dug, in the wet state in all sizes, and dumped directly into the feeding-hopper. The clay is automatically discharged. Upkeep of the machine is low.

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